

ABSTRACT

**REED-SOLOMON DECODER AND DECODING METHOD
FOR ERRORS AND ERASURES DECODING**

A single polynomial expander 22 is time multiplexed to produce firstly a modified syndrome polynomial $T(x)$ and 10 then an erasure located polynomial $\Lambda(x)$. $T(x)$ is supplied to a key equation solving unit 32 which solves the key equation to calculate an error locator polynomial $\sigma(x)$ and an errata evaluator polynomial $\omega(x)$. These polynomials 15 $\sigma(x)$, $\Lambda(x)$ and $\omega(x)$ form three inputs to polynomial evaluators 52-56 and a Forney block 62 for determining the location and magnitude of each symbol error and symbol erasure, allowing the received codeword to be corrected in a correction block 72. Optionally, a transform block 42 is provided to avoid unnecessary delay and improve 20 throughput when decoding shortened codewords.

[Figure 2]